

# Determination of Absolute Gas Adsorption Isotherms by Combined Calorimetric and Dielectric Measurements

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## ABSTRACT

A new method to determine absolute masses of gas adsorbed on the external and internal surfaces of a porous solid is proposed. It consists on a combination of calorimetric and dielectric measurements. These lead to the enthalpy and the dielectric polarization of the adsorbed phase from which by purely thermodynamic calculations the absolute mass adsorbed can be determined without using the so-called helium volume hypothesis nor any other equivalent assumption.

As example adsorption of subcritical carbon dioxide ( $\text{CO}_2$ ) on zeolite (Degussa DAY) at 298 K and pressures up to 0,4 MPa is considered. As expected data of absolute masses adsorbed are always somewhat larger than the corresponding Gibbs excess masses calculated from both volumetric and gravimetric measurements via the helium volume of the zeolite.